EPA Region 7 TMDL Review

TMDL ID	345	*Water Body ID*	3282
Water Body Name	Turkey Creek		
Pollutant	Biological Oxygen Demand and Volatile Suspended Solids		
Tributary			
State	MO	*HUC*	07140104
Basin	Big Basin		
Submittal Date	12/23/2004		
Approved	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

A letter formally submitting this TMDL under Section 303(d) of the Clean water Act was received December 28, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The loading capacity for biological oxygen demand (BOD) and volatile suspended solids (VSS) is identified, and was determined using the QUAL2E water quality model, and best professional judgement, respectively. Violation of narrative standards for VSS have been observed in the form of sludge deposits, floating paper, and sewer odors directly downstream and attributable to the Bonne Terre wastewater treatment plant (WWTP). BOD loading resulting in violations of the dissolved oxygen (DO) criterion were modelled based upon meeting 5.5 mg/L DO in Turkey Creek which, upon implementation of the WLA concentration-based limits, should result in attainment of both narrative and numeric water quality standards (WQS) for the protection of the Warm Water Aquatic Life Use.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

All WQS, criteria, and beneficial uses have been described. BOD is the parameter used to determine the impact that the wastewater will cause on DO levels in Turkey Creek. The VSS criteria is narrative, therefore in this TMDL, the target value used was derived using all of the instream data and selecting the 25th percentile value.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

The numeric link between DO and BOD was generated by the water quality model QUAL2E. The instream data analysis for VSS resulted in a value of 2.499 mg/L, the standard notation for non-detection where the lowest detectable concentration is 5 mg/L. The target value of 5 mg/L VSS was set at the junction of the effluent tributary and Turkey Creek.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

Land use and soils are described, as well as the history of the area. The sole source of the impairment is the Bonne Terre WWTP, NPDES permit number MO-0100706. Bypassing of raw sewage by a lift station located next to Turkey Creek is noted to have been a chronic problem. All significant sources have been considered.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The QUAL2E model was calibrated to bring the simulation of flow, velocity, BOD, DO, organic nitrogen, ammonia nitrogen, nitrate and nitrite nitrogen, total phosphorus, and VSS within the range of measured data for these parameters. The WLAs for BOD and VSS were derived form adjusting the plant discharge in the model to full design flow of 0.95 cfs, and the instream flow to 0.1 cfs. An additional test was done with the model with the application of winter conditions. No mixing zone in the main stream was considered. The WLA concentrations are identified and will be incorporated into Bonne Terre's WWTP NPDES permit in the next permit reissuance which is scheduled for January 14th, 2005.

WLA Comment

The WLAs for Bonne Terre WWTP are 10 mg/L BOD, 10 mg/L TSS, 1.2 mg/L NH3-N May through October, and 3 mg/L NH3-N November through April.

LA Comment

The load allocation is zero.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

The target value for BOD was set to maintain the DO criterion plus an explicit MOS for a minimum of 5.5 mg/L of DO throughout the stream.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation and critical conditions are accounted for by using the critical low flow in the modeling efforts and implementing seasonal ammonia limits.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

This TMDL was on public notice from November 19th to December 19th, 2004. Groups receiving the public notice included the Missouri Clean Water Commission, Bonne Terre Northwest WWTP, the Water Quality Coordinating Committee, the TMDL advisory Committee, Stream Team volunteers in the watershed, 3 legislators and others that routinely receive public notice of NPDES permits. Comments received were responded to by MDNR.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

Monitoring plans include completing a low flow study, a sediment study in 2005, and special studies in 2006 and 2007. Monthly instream monitoring below the plant is currently required, and will be incorporated as a requirement in the reissued NPDES permit.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Missouri has the authority to write and enforce NPDES permits. Inclusion of effluent limits for BOD, TSS, NH3-N, and other parameters as necessary, and quarterly monitoring of the effluent reporting, in addition to instream monitoring, should provide reasonable assurance that WQS will be achieved.